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REMARKS

In the Office Action, the Examiner rejected claims 1-4, 6-8, 11-13, and 15-23 pursuant to 35 U.S.C. § 103(a) as being unpatentable over Wright, et al. (U.S. Patent No. 6,016,285) in view of Bunce (U.S. Patent No. 6,371,918). Claims 5 and 9 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Wright, et al. in view of Bunce, and further in view of Breimesser, et al. (U.S. Patent No. 5,622,177). Claims 10 and 14 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Wright, et al. in view of Bunce and in further view of Bamber (U.S. Patent No. 5,538,004). Claim 25 was rejected over Wright, et al. in view of Bunce, and further in view of official notice. Applicants respectfully request reconsideration of the rejections of claims 1-24, including independent claims 1, 11, 16 and 20.

Independent claim 1 recites an analog-to-digital converter between the transducer and the releaseable connector. Wright, et al. and Bunce do not disclose this limitation.

Wright, et al. show a receive beamformer with analog-to-digital converters (Fig. 4A; and col. 22, lines 5-13). However, the beamformer is part of the ultrasound imaging system connected at the multiplexer 4 by cables to the transducer 1 (Fig. 4A). Wright, et al. show a complicated, cart-based type system with the converters as part of the system, so do not show the analog-to-digital converter between the transducer and the connector.

Bunce describe a connector (abstract). The connector has a conduit for the cables to the transducer (col. 2, lines 30-37). A pin 22 and retaining pins 23 are used on a connector board with gold plated contacts 34 for connection to the imaging system (col. 2, lines 47-56). Figure 4 shows the pin 22. The pin is for engaging and disengaging a mating side on the console or imaging system (col. 2, lines 44-46 and 49-53). The mating connector on the console/imaging system side is shown in Figure 5 and includes pin slots 53 and hole 54 for mating with the transducer connector (col. 2, lines 57-64). The mating/console side is described as including the circuitry (col. 1, lines 56-64). By using a circuit board connection, Bunce saves space by allowing circuits in the console/imaging side close to the connector. Bunce does not suggest circuits between the transducer and detachable connector.

A person of ordinary skill in the art would not have used the beamformer of Wright, et al. with the transducer connector of Bunce. Bunce distinguish larger, cart-based, scanning devices from more portable systems (col. 1, lines 11-22 and 36-47). The connectors for these sophisticated systems are quite reliable and maintain good signal fidelity (col. 1, lines 37-39). Wright, et al. discloses a very sophisticated beamformer system for the cart-based Acuson Sequoia System. Given Bunce's specific teaching that connectors for such systems are good, the small highly portable connector design of Bunce would not have been used with the beamformer of Wright, et al.

Independent claim 11 recites a detachable transducer assembly with an analog-to-digital converter in a connector housing, which is physically detachable from a connector on the system housing. As discussed above for claim 1, Wright, et al. and Bunce position circuits on a system side, so do not suggest these limitations. A person of ordinary skill in the art would not have used the Wright, et al. beamformer system with the transducer connector of Bunce.

Independent claim 16 recites a processor connected between the transducer and releasable connector. As discussed above for claim 1, Wright, et al. and Bunce do not suggest circuits on the transducer side of the releasable connector. As another reason for allowance, the connector of Bunce would not have been used with the beamformer of Wright, et al.

Independent claim 20 recites converting signals to digital data in the probe assembly. Claim 20 is allowable for any of the same reasons as claim 1.

Dependent claims 2-10, 12-15, 17-19 and 21-24 each depend from one of the independent claims above, so is each allowable for the same reasons as the corresponding base claim. Further limitations distinguish from the cited references.

Claim 6 recites a summer operable to output combined signals to electrical outputs of a releaseable connector. The summer of Wright, et al. is not disclosed as in the transducer assembly.

Claim 7 recites a partial beamformer outputting to the electrical outputs. Wright, et al. do not disclose the beamformer in the transducer assembly.

Claims 8 and 15 are allowable for a similar reason as claims 6 and 7.

Claim 9 recites a switch to bypass analog signals to the electrical output. Breimesser, et al. multiplex the signals. There is no suggestion of a switch to bypass.

Claims 10 and 14 recite a serializer connected with the outputs. There is no suggestion to position a serializer in the transducer assembly. The Examiner cites to all of Bomber for the serializer without any specific citation, so detailed citations are requested if this rejection is maintained.

Claim 13 recites a demultiplexer housed in the connector housing. The cited references do not suggest this placement. Claim 23 is allowable for a similar reason.

Claims 17 and 21 are allowable for the same reasons as claim 1.

Claim 19 recites partial beamforming by a processor in the connector housing. The cited references do not show partial beamforming in this location.

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CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 943-7554 or Craig Summerfield at (312) 321-4726.

PLEASE MAIL CORRESPONDENCE TO: Respectfully submitted,

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